CLAIMS

1. A vapor grown carbon fiber, each fiber filament of the carbon fiber having a branching degree of at least 0.15 occurrences/μm.

2. A vapor grown carbon fiber characterized by comprising carbon fiber filaments, each having a branching degree of at least 0.15 occurrences/μm, in an amount of at least 10 mass%.

3. A vapor grown carbon fiber having a bulk density of 0.025 g/cm^3 or less.

4. The vapor grown carbon fiber according to claim 1 or 2, which has a bulk density of 0.025 g/cm^3 or less.

5. The vapor grown carbon fiber according to any of claims 1 to 3, which, when compressed so as to have a bulk density of 0.8 g/cm^3, has a specific resistance of 0.025 Ωcm or less.

6. The vapor grown carbon fiber according to any of claims 1 to 3, each fiber filament of the carbon fiber having a diameter of 1 to 500 nm.

7. The vapor grown carbon fiber according to any of claims 1 to 3, which is produced by feeding a raw material solution containing a carbon source and a transition metallic compound

into a reaction zone through spraying at a spray angle of 3° to 30° and subjecting the raw material solution to thermal decomposition.

8. The vapor grown carbon fiber according to any of claims 1 to 6, which is produced by feeding a raw material solution containing a carbon source and a transition metallic compound into a reaction zone through spraying, while feeding a carrier gas through at least one site other than an inlet through which the raw material solution is sprayed, and subjecting the raw material solution to thermal decomposition.

9. A method for producing a vapor grown carbon fiber comprising spraying a raw material solution containing a carbon source and a transition metallic compound into a reaction zone and subjecting the raw material solution to thermal decomposition, characterized in that the raw material solution is sprayed at a spray angle of 3° to 30°.

10. The method for producing a vapor grown carbon fiber according to claim 9, wherein droplets of the raw material solution have an average diameter of at least 5 μm.

11. The method for producing a vapor grown carbon fiber according to claim 9 or 10, wherein the raw material solution and a carrier gas are fed through a concentric multi-tube nozzle into a reaction tube.

12. The method for producing a vapor grown carbon fiber according to claim 11, wherein the raw material solution is fed through one of the tubes of the multi-tube nozzle, and another tube serves as a passage for the carrier gas only.

13. The method for producing a vapor grown carbon fiber according to claim 12, wherein the raw material solution and the carrier gas are fed through the inner tube of concentrically disposed two tubes, and the carrier gas is fed through the outer tube of the tubes.

14. The method for producing a vapor grown carbon fiber according to claim 12, wherein the carrier gas is fed through the innermost tube and the outermost tube of concentrically disposed three tubes, and the middle tube of the tubes serves as a passage for the raw material solution only.

15. A method for producing a vapor grown carbon fiber comprising spraying a raw material solution containing a carbon source and a transition metallic compound into a reaction zone and subjecting the raw material solution to thermal decomposition, characterized in that a carrier gas is fed through at least one site other than an inlet through which the raw material solution is sprayed.

16. The method for producing a vapor grown carbon fiber

according to claim 15, wherein the raw material solution is sprayed at a spray angle of 3° to 30°.

17. The method for producing a vapor grown carbon fiber according to claim 9 or 15, wherein the raw material solution containing a carbon source and a transition metallic compound further contains a surfactant and/or thickening agent.

18. The method for producing a vapor grown carbon fiber according to claim 9 or 15, which comprises heating and firing recovered carbon fiber in a non-oxidative atmosphere at 800°C to 1,500°C and subsequently heating the thus-fired carbon fiber in a non-oxidative atmosphere at 2,000 to 3,000°C, to thereby graphitize the carbon fiber.

19. The method for producing a vapor grown carbon fiber according to claim 18, wherein, before being graphitized through heating, the recovered carbon fiber is doped with at least one boron compound, serving as a crystallization facilitating compound, selected from the group consisting of boron, boron oxide, boron carbide, a boric ester, boric acid or a salt thereof, and an organic boron compound in an amount of 0.1 to 5 mass% as reduced to boron.

20. A composite material comprising a vapor grown carbon fiber according to any of claims 1 to 8.

21. A composite material comprising a vapor grown carbon fiber produced through a method according to any of claims 9 to 19.

22. A resin composition comprising a vapor grown carbon fiber according to any of claims 1 to 8.

23. A resin composition comprising a vapor grown carbon fiber produced through a method according to any of claims 9 to 19.